MILITARY SPECIFICATION SHEET

WIRE, ELECTRIC, FLUOROCARBON/POLYIMIDE INSULATED, MEDIUM WEIGHT, NICKEL COATED COPPER CONDUCTOR, 600 VOLTS, 200°C, NOMINAL 8.4 OR 15.4 MIL WALL

This specification is approved for use by all Departments and Agencies of the Department of Defense.

The complete requirements for procuring the wire described herein shall consist of this document and the issue in effect of Specification MIL-W-81381.

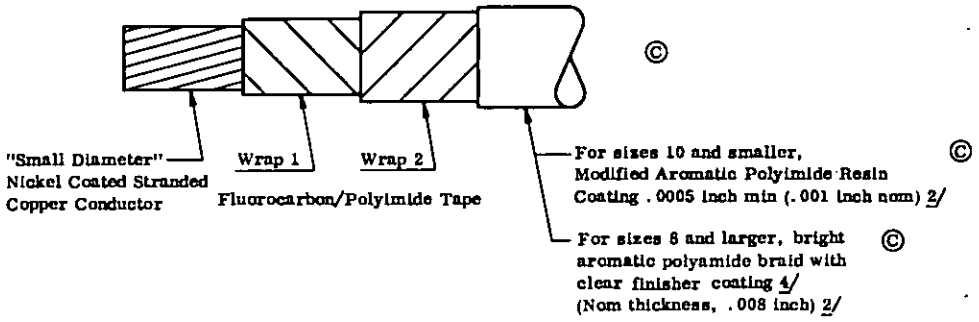

TABLE I. Construction details.

Part Number 1/	Wire Size	Conductor			Finished Wire				Insulation Tapes			
									Wrap 1		Wrap 2	
		Stranding (Number of Strands X AWG gage of strands)	Diameter (inches) (min)	Diameter (inches) (max)	Resistance at 20°C (68°F) (ohms/1000 ft) (max)	Diameter (inches) (min-max)	Weight (lbs)/1000 ft) (nom) 2/	Weight (lbs)/1000 ft) (max)	Tape Code 3/	Overlap(%) (min)	Tape Code 3/	Overlap(%) (min)
M81381/12-24-*	24	19 x 36	.023	.024	25.9	.040-.045	2.1	2.2	0/2/.5	50	.1/1/.1	50
M81381/12-22-*	22	19 x 34	.029	.031	16.0	.045-.050	3.0	3.2				
M81381/12-20-*	20	19 x 32	.037	.039	9.77	.053-.058	4.6	4.8				
M81381/12-18-*	18	19 x 30	.046	.049	6.10	.063-.068	6.8	7.2				
M81381/12-16-*	16	19 x 29	.052	.055	4.76	.068-.074	8.6	9.0				
© M81381/12-14-*	14	19 x 27	.065	.069	3.00	.081-.087	13.1	13.8				
© M81381/12-12-*	12	37 x 28	.084	.089	1.98	.100-.107	19.9	20.9				
© M81381/12-10-*	10	37 x 26	.106	.112	1.24	.122-.129	30.7	32.4				
© M81381/12-8-*	8	133 x 29	.158	.169	.694	.188-.206	58.7	61.8			.5/1/.5	50
© M81381/12-6-*	6	133 x 27	.198	.212	.436	.228-.251	90.4	95.1				
© M81381/12-4-*	4	133 x 25	.250	.268	.275	.280-.306	141	148				
© M81381/12-2-*	2	665 x 30	.320	.340	.177	.350-.378	224	235				

1/ Part Number: The asterisks in the part number column, Tables I and II, shall be replaced by color code designators in accordance with MIL-STD-681, except that opaque dark yellow as specified in MIL-W-81381 shall be designated by the letter "N" and unpigmented polyimide resin coating shall be designated by the letter "C". Examples: Size 20, opaque dark yellow - M81381/12-20-N; same with orange stripe - M81381/12-20-N3.

2/ Nominal values are for information only. Nominal values are not requirements.

3/ Tape Codes: 0/2/.5 2 mil polyimide film/0.5 mil FEP fluorocarbon resin
.1/1/.1 0.1 mil FEP fluorocarbon resin/1 mil polyimide film/0.1 mil FEP fluorocarbon resin
.5/1/.5 0.5 mil FEP fluorocarbon resin/1 mil polyimide film/0.5 mil FEP fluorocarbon resin

FEP = Fluorinated Ethylene Propylene

© 4/ Braid (Sizes 8 and larger): Bright aromatic polyamide yarn, 200 denier, 100 filaments, tightly formed, uniform in appearance, treated with a clear finisher coating. Finisher coating shall be compatible with the 200°C temperature rating and the performance requirements of the insulated wire.

© denotes changes.

TABLE II. Performance details.

Part Number	Durability Test Load for		Abrasion Resistance			Resistance (inches of tape) (min)	Bend Testing				Test Load (lbs) (±3%)	
							Mandrel diameter (inches)(±3%)					
	Color Markings (grams)	Insulation Coatings (lbs)	Weight Support Bracket	Weight (lbs)	Tension Load (lbs)		Life Cycle (Oven & bend tests) 2/	Cold Bend Test	Wrap Test	Wrinkle Test ©	Life Cycle (Oven & bend tests) 2/	Cold Bend Test
M81381/12-24-*	75	.75	A	1.0	1.0	12	.250	.250	.125	.156	.500	
M81381/12-22-*	100	1.00	A	1.0	1.0	14	.250	.250	.125	.188	.750	
M81381/12-20-*	100	1.00	A	1.0	1.0	16	.250	.250	.125	.250	.750	
M81381/12-18-*	150	1.00	A	1.0	1.0	16	.375	.375	.250	.312	1.00	
M81381/12-16-*	150	1.00	A	1.0	1.0	20	.375	.375	.250	.375	1.00	
M81381/12-14-*	150	1.00	B	1.0	2.0	24	.500	.375	.375	.500	2.00	
M81381/12-12-*	150	1.00	B	1.0	2.0	26	.750	.750	.375	.750	2.00	
M81381/12-10-*	150	1.00	B	1.0	2.0	26	.750	.750	.375	1.00	3.00	
M81381/12-8-*	150	1/	© C	4.25	2.0	18	2.00	2.00	1.00	1/	3.00	
M81381/12-6-*	150	1/	C	4.25	2.0	27	4.50	4.50	2.00	1/	3.00	
M81381/12-4-*	150	1/	C	4.25	2.0	27	6.00	6.00	3.00	1/	4.00	
M81381/12-2-*	150	1/	C	4.25	2.0	27	6.00	6.00	4.00	1/	6.00	

1/ Test not applicable

2/ Also for bend tests after immersion

WIRE RATINGS AND ADDITIONAL REQUIREMENTS

TEMPERATURE RATING: 200°C (392°F) max conductor temperature
VOLTAGE RATING: 600 volts (rms) at sea level
BLOCKING: Oven temperature, 200 ±2°C (392 ±3.6°F)
© BRAID FRAYING: The aromatic polyamide braid with finisher (wire sizes 8 and larger) shall be non-fraying and shall be firmly adherent to the underlying insulation. This examination shall be included in the MIL-W-81381 quality conformance inspection as a Group II characteristic, one specimen to be examined from each sample unit.
© COLOR: Sizes 24 through 10: As specified in contract or order in accordance with MIL-W-81381.
Sizes 8 through 2: The natural color of the finisher-treated aromatic polyamide braid (off-white to amber) is preferred (color designator "C"). Other colors, varying with the supplier, are available. The MIL-STD-104 color limits and the extended color limits of MIL-W-81381 are not applicable to these sizes.
FLAMMABILITY: 3 sec (max) after-flame
3.0 inches (max) flame travel
No flaming of tissue paper
HUMIDITY RESISTANCE: 5 megohms-1000 ft, min insulation resistance after humidity exposure
IDENTIFICATION OF PRODUCT: Required for sizes 22 and larger.
IDENTIFICATION, STRIPING, OR BANDING DURABILITY: 125 cycles (250 strokes); see Table II for test load.
IMPULSE DIELECTRIC TEST: 100% test; impulse voltage as specified in MIL-W-81381
INSULATION RESISTANCE: 2500 megohms-1000 ft (min)
LAMINATION SEALING: Oven temperature, 230 ±2°C (446 ±3.6°F)
LIFE CYCLE: Oven temperature, 230 ±2°C (446 ±3.6°F) for 500 hours
MINIMUM WALL THICKNESS: Sizes 24 through 10: 6.0 mils
Sizes 8 through 2: 15.0 mils
POLYIMIDE CURE TEST: Applicable to sizes 10 and smaller
PROPELLANT RESISTANCE: Test not required
© RESIN COATING DURABILITY: Sizes 24 through 10: 250 cycles (500 strokes); see Table II for test load.
Sizes 8 through 2: Test not applicable
SHRINKAGE: 0.031 inch (max) at 230 ±2°C (446 ±3.6°F)
SURFACE RESISTANCE: 5 megohms-inches (min), initial and final readings
THERMAL SHOCK: Oven temperature, 200 ±2°C (392 ±3.6°F) change in measurement, 0.031 inch (max)
WET DIELECTRIC TEST: 2500 volts (rms)
© WRINKLE TEST: Applicable to sizes 10 and smaller. No wrinkles shall be visible in the insulation at 3X magnification (3 diameters) after bending the wire one full turn around the mandrel specified in Table II. (The wire may be examined on the mandrel or after removal of the mandrel leaving the coil intact.) This test shall be included in the MIL-W-81381 quality conformance inspection as a Group II characteristic, one specimen to be tested from each sample unit.

Caution: This wire should not be subjected to physical contact with missile propellants.

Custodians:
Navy - AS
Army - EL
Air Force - 11

User activities:
Navy - MC, OS
Army - AT, AV, MU

Review activities:
Navy - EC, SH
Army - MI
Air Force - 99
DSA - IS
NSA

Preparing activity:
Navy - AS
(Project No. 6145-0705-6)

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DOCUMENT IDENTIFIER *(Number)* AND TITLE

MIL-W-81381/12C Wire Electric, Fluorocarbon/Polyimide Insulated,...Etc.

NAME OF ORGANIZATION AND ADDRESS OF SUBMITTER

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